Project Title: Custom Device to Measure DC Motor Brush Length

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Sponsored By: Imperial Electric

The Imperial Electric location of Nidec Motor Corporation is a manufacturer of brushed, direct-current (DC) motors. These motors undergo endurance testing to determine the operating life of these motors. This testing consists of motors being run under load for thousands of hours, a process that takes several months to complete. Weekly measurements are taken of the motor brushes' lengths to track the amount of wear that occurs throughout the course of the test. This data can be used to extrapolate the overall life expectancy of their DC motors. In order to take these measurements, the motors have to be disassembled, the brushes removed, and measurements taken using a pair of calipers. This method of collecting data is extremely time consuming, labor intensive, and exposes the fragile brushes to potential damage. Any damage to the brushes during these measurements can prematurely end a test or invalidate the test completely, costing Imperial Electric substantial time and money.

Imperial Electric is requesting assistance in developing a device that can collect data on the wear of motor brushes without dismantling the motors or risking the integrity of the endurance test. The objective of this project is to deliver a device that will be able to take measurements of the motor brushes within 0.005 inches precision over 30 repeated measurements, do so at three places on the brush, measure 0.75 inches worth of wear, and take measurements under one hour per motor. This device should be able to measure any motor in Imperial Electric's P66SR family of motors without disassembling or removing any parts in the motor.