

# Team 505: Danfoss Stepper Motor Lifecycle Fixture

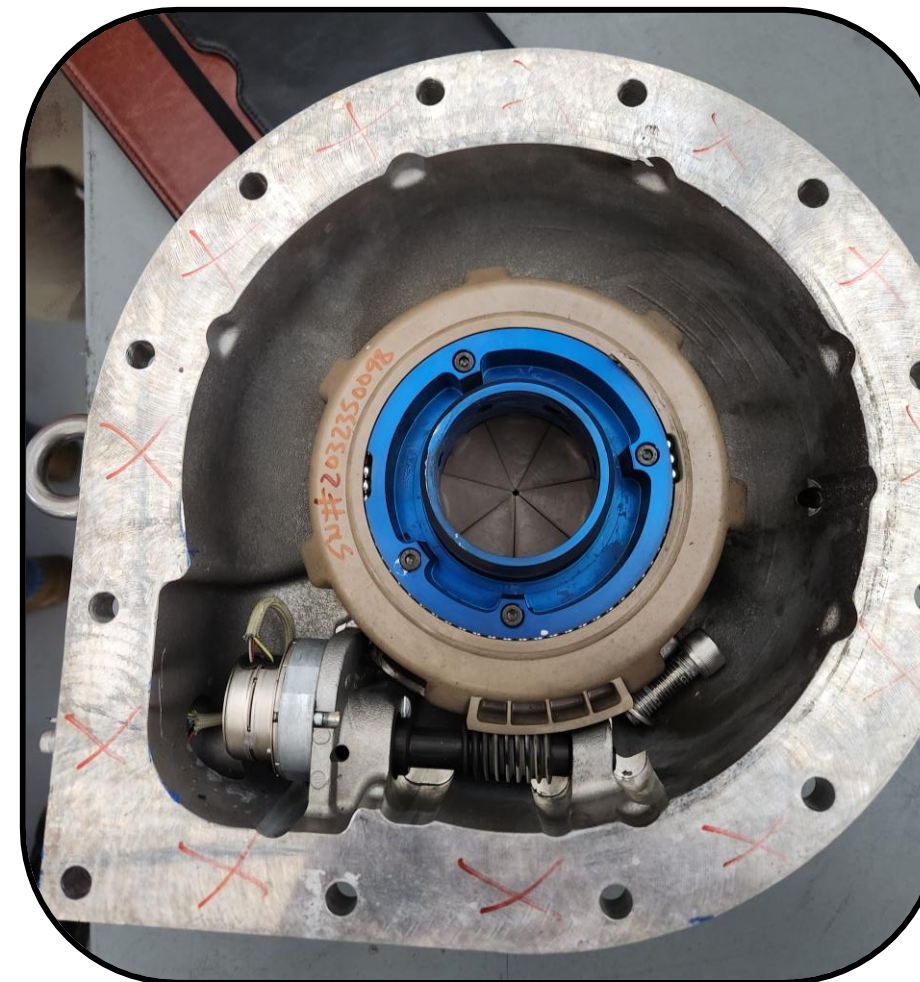


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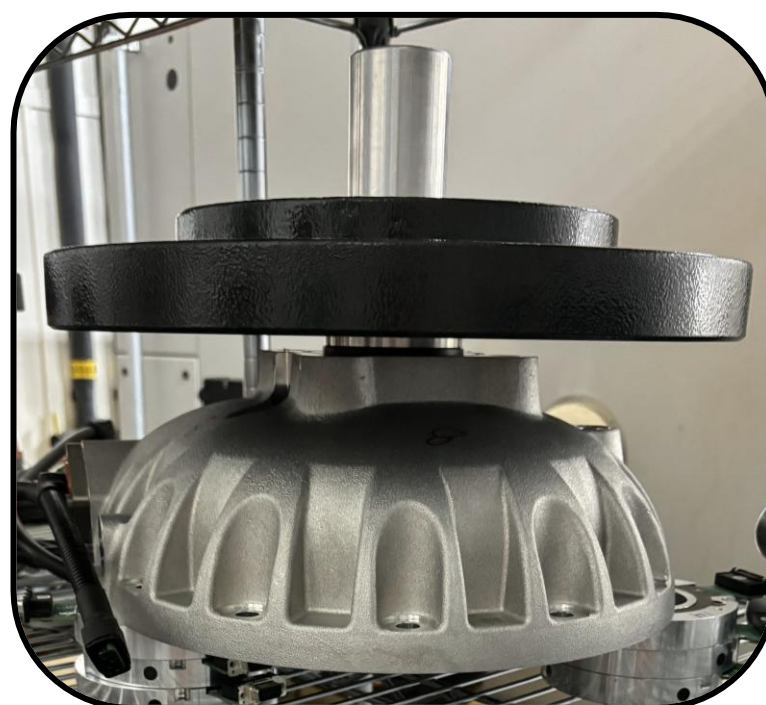
## Background

- Stepper motor actuates the Inlet Guide Vane (IGV) in Danfoss Compressors.
- Danfoss tests the stepper motors to verify lifecycle.
- Lifecycle test involves running the motor at a constant speed against resistance until failure.

### IGV Assembly



### Old Testing Fixture

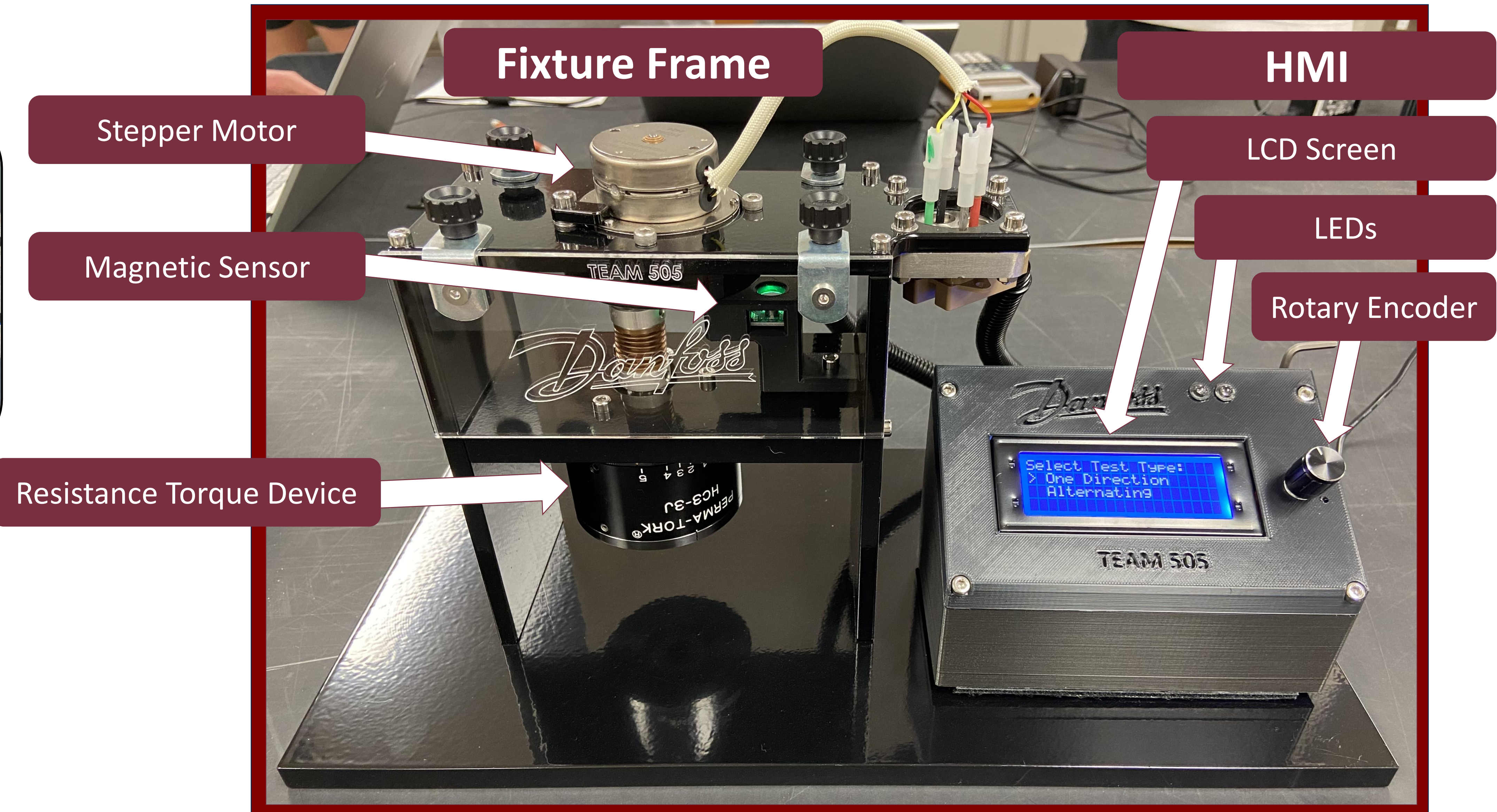


- Inaccurate representation of torque resistance
- Does not stop upon failure
- Does not track runtime
- Difficult user experience

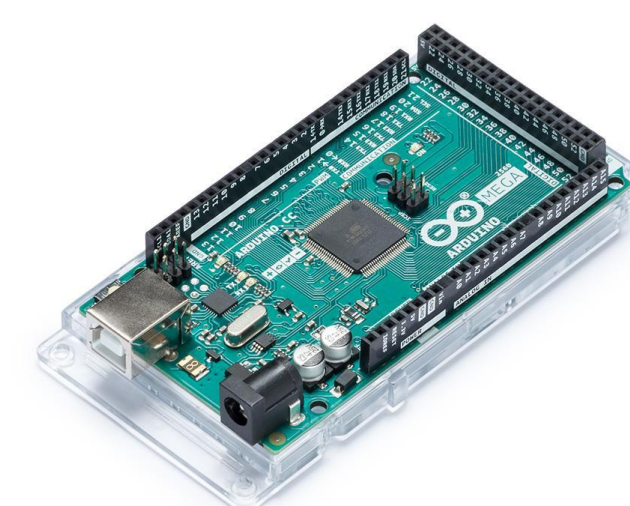
## Objective

The objective of this project is to design and produce a stepper motor lifecycle test fixture for Danfoss Turbocor to improve user-friendliness and reliability over their current testing procedure.

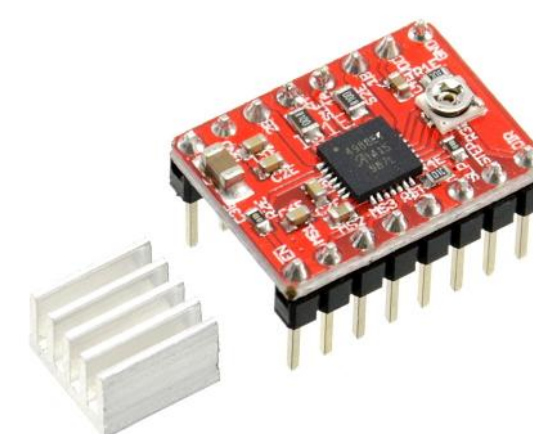
## Final Design Features



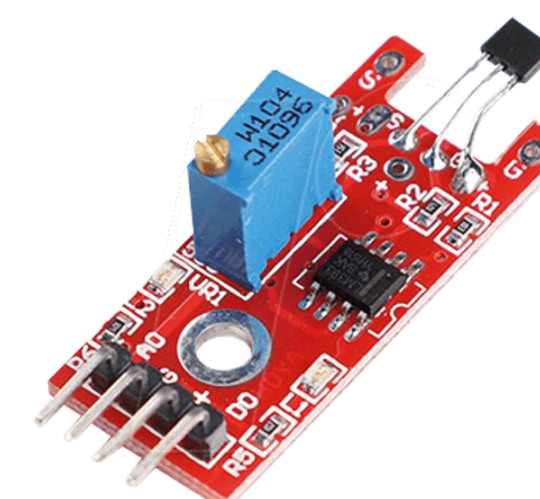
## Main Electronics



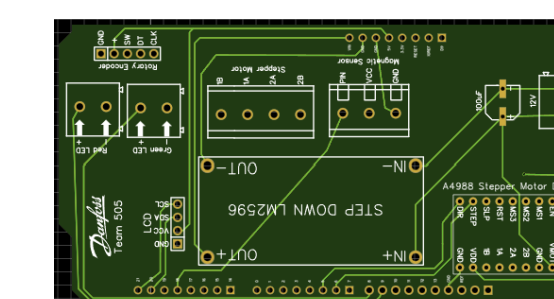
Arduino Mega



Stepper Motor  
Driver



Magnetic  
Sensor



Custom PCB

## Finalized Statistics

- \$5.70 to operate full lifecycle test
- Tracks rotations with 99.4 % accuracy
- Lightweight at 12 lbs per fixture
- 16 in x 8 in x 10 in = 0.74 ft<sup>3</sup>
- \$1,598 Total Package Cost