MOTOR TEST RIG

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Aim: To improve the alignment and functionality of a motor test rig for all Danfoss Turbocor's TT-series compressors.

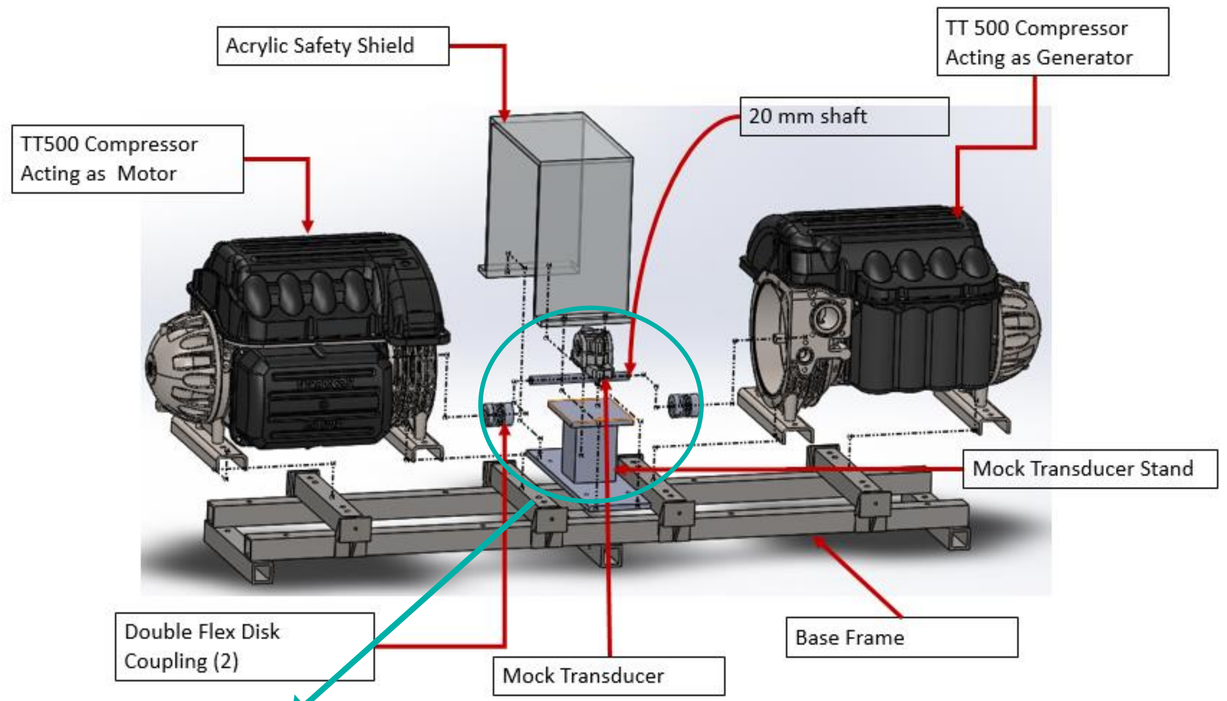
Project Scope

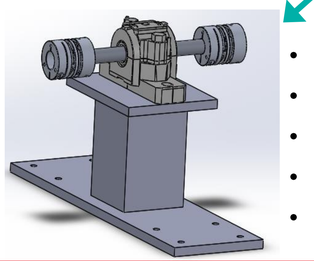
- Danfoss Turbocor needs a system to test the power efficiency of the compressors they manufacture.
- A motor test rig is to be designed.
- 10,000 rpm is to be achieved, but design should be for a maximum speed of 40,000 rpm in mind.
- Torque transducer is to be introduced into the system, to measure the compressor's performance.
- Vibration in the system is to be minimal.

Project Background

- Motor-generator system tests the motor performance by varying the load through a generator; a second compressor will serve as the generator.
- Magnetic bearings – one axial and two radial – allow contact-free levitation.
- TT500 compressor will be used in experimental procedures.
  - Natural Frequency: 904 Hz

Motor Test Rig Design





- Double-flex aluminum disk couplings
- Acts as rigid component to prevent fighting of compressors
- Simplified stand for bearing housing
- 20 mm shaft with length of 201.30 mm
- Bearing housing acting as transducer, just doesn't calculate efficiency

Laser Alignment System

Summary

- A laser alignment tool was incorporated to align the system
- Safety shield was designed and is being manufactured
- Alignment process was simplified and accuracy was improved
- A stand was designed to mount the mock transducer onto the base frame. Currently being machined
- Last year's rigid coupler was replaced with a flexible one that has a higher axial and vertical displacement
- Prevent the two compressors from fighting each other and causing vibration

Project Constraint

Torque transducer could not be purchased due to unfavorable lead time; it was replaced with a bearing housing to verify the design theory.

Future Work

- Machining the safety shield
- Implementing the torque transducer
- Running the test rig up to 40,000 rpm

Acknowledgement

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