

Abstract

The High-Speed Motor Test Stand Team is designing a system that can prove the efficiency of Danfoss compressors. This stand will be used by the Danfoss research and development team to validate the performance of their compressors. This project is a continuation of two previous senior design teams. In the current setup, two compressors are connected by a motor shaft. One compressor is the one being studied, while the other serves as a variable load to test a range of compressor speeds. The torque, which is needed to measure the efficiency, is then measured by a sensor between the compressor shafts. The past teams created the frame of the test stand, purchased an alignment system for the compressor shafts, and used a simple coupling to connect the compressors. The test stand can currently reach a maximum speed of 5,000 rpm because of alignment difficulties causing the compressor to shut down. This year's team is developing a method for coupling the compressor shafts more effectively. This will allow for precision alignment of the shafts before operation, while keeping the assembly balanced and controlling the amount of axial misalignment during operation to reach the goal speed of 10,000 rpm. The team is also choosing a suitable sensor, but Danfoss is not buying it this year because they want to make sure the current design works. The final design will be specified to reach a speed of 40,000 rpm, the maximum speed of their compressors.