



Variable Frequency Drive Integration And Validation for Air Compressor

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Abstract:

Variable frequency drive (VFD) is a crucial part that controls the compressor motor's speed to increase energy efficiency and save device wear and tear. Variable frequency drives possess two primary characteristics: the ability to modify speeds and provide smooth torque. VFDs are an effective controller to regulate the AC motors because of their start/stop capabilities and other advantages. A Variable Frequency Drive (VFD) consists of four fundamental elements: the rectifier, intermediate DC link, inverter, and control circuit. Beyond offering adjustable speeds to achieve precise control objectives, VFDs also yield additional benefits by enhancing process control and promoting energy conservation. VFDs for air compressors are a practical way to reduce energy consumption and enhance system performance. Through the creation of a model using Simulink in the Matlab software and validation through a number of tests, a proposed variable frequency drive system is integrated into the air compressor's system in a way to control the speed of the motor. This highlights the significance of proper validation processes in order to make sure that the VFD integration works properly and that the air compressor works safely and reliably.

Keywords:

Air Compressor, Variable Frequency Drive (VFD), Gretz Circuit, Sliding mode controller