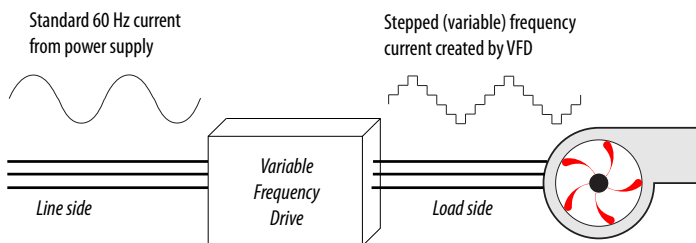


Monitoring Variable Frequency Drive Systems

Introduction

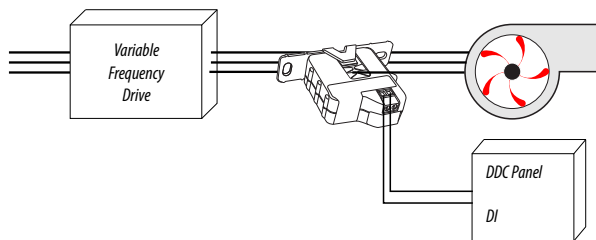
A variable frequency drive (VFD) connected in series between the power source and the motor controls motor speed by varying the frequency of the signal supplying that motor. This is known as a “soft start.” The motor speed is gradually increased or decreased as needed, avoiding the inrush current and the initial torque. A VFD controller, therefore, reduces wear and tear on the motor and saves energy, lowering operational costs.

The VFD line side input is AC. The VFD converts this input to DC power, and then it uses pulse width modulation to convert the signal to a simulated AC waveform. This stepped wave output is sent to the motor.

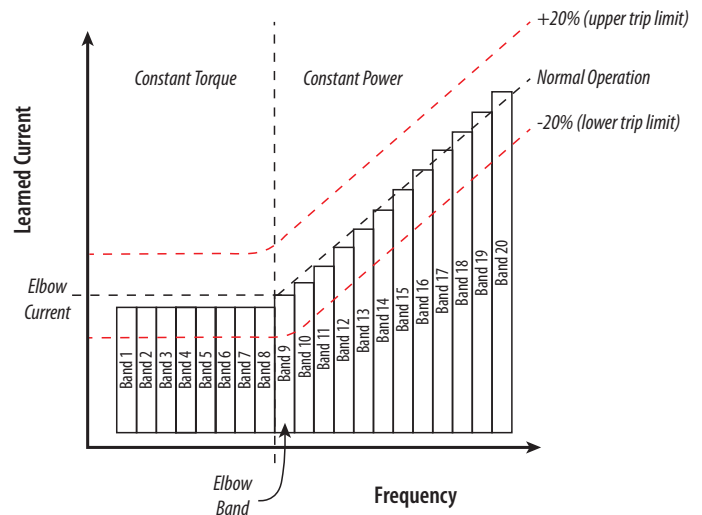


Load Side Current Sensing

To obtain information about the load side of a VFD, install a microprocessor-based current switch that is compatible with VFDs, such as the Veris H614.



When first installed, the H614 learns the system amperage curve by storing the sensed values for normal operation at twenty frequency bands over the entire frequency range. During normal operation, the H614 monitors for changes in current greater than $\pm 20\%$ of the learned load at each frequency band. This allows the sensor to distinguish between a reduced amp draw due to normal changes in the system and an abnormal amperage drop due to belt loss or other mechanical failure.



Many similar current switches only monitor at one to three points in the frequency range. Monitoring at twenty bands over the whole range provides a more detailed profile of the VFD’s current draw, which allows instantaneous detection of problems in performance. The H614 also accurately locates the precise frequency at which the current draw begins to increase in proportion to the frequency, also known as the elbow band. A more accurate profile of the frequency as the current increases reduces errors and false trips.

For more information about VFD related topics, see Veris Application Note VN51 and Veris White Paper VWP13.

Note: Variable Frequency Drives (VFDs) generate radiated interference that can disrupt Veris products and other electronic equipment. A VFD produces a simulated waveform, not a perfect sine wave, which can degrade power quality in the system and possibly the building. It can shut down or damage electronics and create nuisance trips and extra maintenance of electrical equipment. Always understand the application and Veris products when using a VFD system. Apply proper design practices to reduce and manage interference, whether radiated or conducted. This includes, but is not limited to, filters and line reactors to mitigate this problem.

The information provided herein is intended to supplement the knowledge required of an electrician trained in high voltage installations. There is no intent to foresee all possible variables in individual situations, nor to provide training needed to perform these tasks. The installer is ultimately responsible for ensuring that an particular installation is remain safe and operable under the specific conditions encountered.