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(54) **SYSTEM AND METHOD FOR VIBRATION ANALYSIS AND PHASE ANALYSIS OF VIBRATION WAVEFORMS USING DYNAMIC STATISTICAL AVERAGING OF TACHOMETER DATA TO ACCURATELY CALCULATE ROTATIONAL SPEED**

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340/500, 870.16

See application file for complete search history.

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(57) **ABSTRACT**

Vibration analysis is performed on a machine having a variable frequency drive by using a tachometer to monitor rotational speed of the drive shaft and a logic device to calculate speed parameters associated with the drive shaft using the tachometer data. The speed parameters include a maximum speed, a minimum speed, and an average speed of the drive shaft. By correlating the vibration spectra of the motor drive with the speed parameters, machine faults can be identified based upon the energy distribution in the spectra. Further, vibration waveforms from two or more locations on the machine can be sequentially acquired through synchronous triggering by using a pulse edge of a stable tachometer signal. The waveforms can be compared to determine a phase difference to help in identifying any machine faults that may be present.

18 Claims, 7 Drawing Sheets

