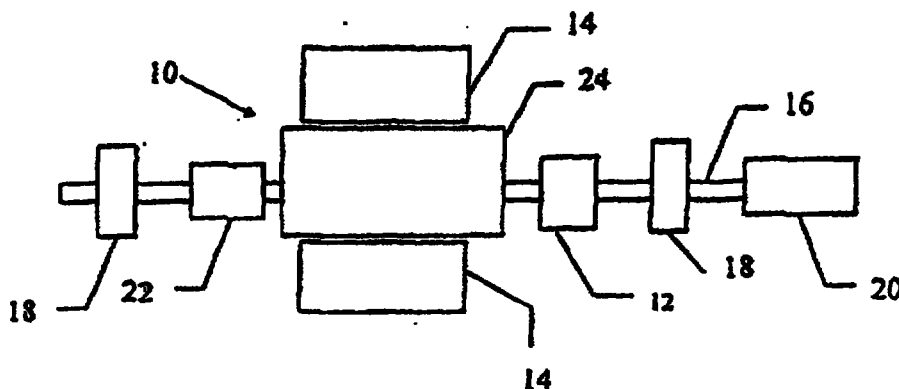


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(54) Title: MODEL-BASED FAULT DETECTION SYSTEM FOR ELECTRIC MOTORS



(57) Abstract

the present invention relates to a model-based fault detection system and method for monitoring and predicting maintenance requirements of electric motors. Since the method and system of the present invention is software based and utilizes data obtained from non-intrusive measurements, implementation costs are significantly less than prior art maintenance methods. The system comprises computer means coupled to sensors which provide continuous real-time information of the input voltage and current and motor speed. The system and method utilize a multivariable experimental modeling algorithm to obtain a mathematical description of the motor. The algorithm compares the modeled result with a measured result and quantifies the comparison in terms of a residual which is generated by subtracting the respective signals. A diagnostic observer analyzes the residual and determines if the motor is fault free or operating in a manner other than fault free. Upon detection of the impending fault, the diagnostic observer evaluates the measured variables of the motor, determines the deviation from the reference value and develops a diagnosis of the likely failed or failing component. Another embodiment of the present invention is particularly useful in the manufacture of fractional horsepower electric motors and especially in the performance of quality control testing.