

Current-Based Multiple Faults Detection in Electrical Motors

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Abstract : Induction motors (IM) are vital components in industrial processes whose failure may yield to an unexpected interruption at the industrial plant, with highly incurred consequences in costs, product quality, and safety. Among different detection approaches proposed in the literature, that based on stator current monitoring termed as Motor Current Signature Analysis (MCSA) is the most preferred. MCSA is advantageous due to its non-invasive properties. The popularity of motor current signature analysis comes from being that the current consists of motor harmonics, around the supply frequency, which show some properties related to different situations of healthy and faulty conditions. One of the techniques used with machine line current resorts to spectrum analysis. Besides discussing the fundamentals of MCSA and its applications in the condition monitoring arena, this paper shows a summary of the most frequent faults and their consequence signatures on the stator current spectrum of an induction motor. In addition, this article presents different case studies of induction motor fault diagnosis. These faults were seeded in the machine which was run for more than an hour for each test before the results were recorded for the faulty situations. These results are then compared with those for the healthy cases that were recorded earlier.

Keywords : induction motor, condition monitoring, fault diagnosis, MCSA, rotor, stator, bearing, eccentricity

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