

Design and Development of On-Line, On-Site, In-Situ Induction Motor Performance Analyser

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Abstract : In the present scenario of energy crises, energy conservation in the electrical machines is very important in the industries. In order to conserve energy, one needs to monitor the performance of an induction motor on-site and in-situ. The instruments available for this purpose are very meager and very expensive. This paper deals with the design and development of induction motor performance analyser on-line, on-site, and in-situ. The system measures only few electrical input parameters like input voltage, line current, power factor, frequency, powers, and motor shaft speed. These measured data are coupled to name plate details and compute the operating efficiency of induction motor. This system employs the method of computing motor losses with the help of equivalent circuit parameters. The equivalent circuit parameters of the concerned motor are estimated using the developed algorithm at any load conditions and stored in the system memory. The developed instrument is a reliable, accurate, compact, rugged, and cost-effective one. This portable instrument could be used as a handy tool to study the performance of both slip ring and cage induction motors. During the analysis, the data can be stored in SD Memory card and one can perform various analyses like load vs. efficiency, torque vs. speed characteristics, etc. With the help of the developed instrument, one can operate the motor around its Best Operating Point (BOP). Continuous monitoring of the motor efficiency could lead to Life Cycle Assessment (LCA) of motors. LCA helps in taking decisions on motor replacement or retaining or refurbishment.

Keywords : energy conservation, equivalent circuit parameters, induction motor efficiency, life cycle assessment, motor performance analysis

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