

This paper deals with the discernment of broken magnet and static eccentricity faults in permanent magnet synchronous motors through the stator phase current. Broken magnet and static eccentricity faults exhibit very similar fault patterns in back-electromotive force (emf) and flux spectrums. Therefore, it is essential to separate these faults from each other for a true diagnosis. In this study, stator emf and phase current waveforms are analyzed in detail to identify the discerning components and characterize their dynamic behaviors. Two-dimensional time-stepping finite-element simulations and experimental results show that the fault classification process can be implemented by using fault-dependent in-phase current fault signatures.