

Resolvers are electromagnetic position sensors that are widely used in industrial applications. In this study, a new axial flux brushless resolver (AFBR) with a wound rotor is introduced. In the proposed resolver, the core of the rotary transformer (RT) is omitted, and an innovative design is used to supply the excitation winding of the resolver. The proposed resolver can be built with smaller dimensions, and its thermal stability and mechanical strength are increased compared with conventional AFBRs. The performance of the proposed structure is simulated and optimized by using a three-dimensional time-stepping finite element method. The effect of the leakage flux of the RT on the excitation and signal windings is also discussed for both the proposed and conventional structures. A prototype based on the optimized topology is constructed and tested. Good agreement is obtained between the simulation and experimental results, validating the success of the proposed resolver.

