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Tue-Af-Po2.19-03 [44]: Research on Driving Coil with Coupling Cooling Method in Electromagnetic Forming

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The long-life driving coil is the prerequisite for Electromagnetic forming industrial application, so far, the temperature rise is one of the major factors that restraint its working life. This paper proposes a new coupling cooling method of driving coil by placing extra cooling coil with timing control system on the other side, which can reduce the Joule heating and temperature rise of the system. In this study, a finite element simulation model of Electrical circuit-Electromagnetic field-Thermal coupling has been established, then the temperature rise of driving coil by changing the structural parameters of the cooling coil: number of turns, cross-sectional area and electrical conductivity have been analysed. The simulation results show that it is effective to reduce the Joule heating in the driving coil and the average temperature rise was reduced by 13 degrees, fell 22.8% in this new method.

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