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A Study on the Power Converter Performance Comparison & Optimal design induction heating coil for IH jar

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The principle of the induction heating is based on the Faraday's law of electromagnetic induction. High frequency AC current flowing through the working coil induces magnetic field to the designated direction. The induced magnetic field enables Eddy current to flow at the surface of the conduction material located in the magnetic field and the current flowing through the conductor produces thermal energy. The IH application has been rapidly developed according to the development of power semi-conductor devices since 1980 because of following advantages compared with the direct fired heating method. The IH technology is used for induction furnace, melting, and heat treatment of metal as industrial applications while microwave oven, IH rice cooker, IH cooker as kitchen applications. Especially, IH products for home cookware are highly interested. Among them, IH electric rice cookers are being developed mainly in Southeast Asia including Japan, Korea, and China. In this paper, modeling an electric circuit of a working coil and an inner pot and modeling integrated equivalent circuit for electric field analysis. Through the modeling results, working coil structure suitable for IH electric rice cooker to optimize heat conversion efficiency was optimized and designed. As a result of the experiment, it was confirmed that the conversion efficiency of about 3% was improved

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